

# **POND SEALING OR LINING FLEXIBLE MEMBRANE LINING CODE 521A**

Natural Resources Conservation Service  
Conservation Practice Standard

## **I. Definition**

A functionally continuous sheet of synthetic or partially synthetic, flexible, water proof material.

## **II. Purpose**

To impede or prevent excessive water seepage losses from ponds and contamination of groundwater and soils from waste water storage.

## **III. Conditions Where Practice Applies**

This practice applies to the sealing of ponds, water storage structures, or agricultural waste water structures built in excavated earth or of earthfill; and require sealing with flexible membrane linings made of synthetic or partially synthetic materials.

This practice applies where leakage from the structure will be of such magnitude as to prevent the facility from fulfilling its planned purposes, damage land or crops, contaminate ground water, or adjacent soils or otherwise be environmentally damaging.

## **IV Federal, State, and Local Laws**

Pond sealing or lining systems shall comply with all federal, state and local laws, rules or regulations governing pond sealing or lining systems or the structures that will be lined. The operator is responsible for securing required permits. This standard does not contain the text of the federal, state or local laws governing pond sealing or lining systems.

## **V. Criteria**

A. Site Assessment- The site assessment shall be performed and documented to determine physical and chemical site characteristics that will influence the placement, construction, maintenance and

environmental integrity of proposed lining system. The site assessment shall include:

1. Site of pond or structure to be lined.
2. Characteristics of the liquid to be stored:
  - a. pH.
  - b. chemical makeup.
3. Odor and Aesthetics
4. Soils-A thorough geotechnical investigation of the site shall be carried out in order to ensure underlying soil stability under all circumstances. The type of soil (Unified Soil classification System) presence of watertable, soil permeability, thickness of the strata, and depth under the lining system shall be documented.
5. Identification of potential impacts from failure of the storage facility or liner.

B. Design- Structures to be lined shall be designed and constructed to meet Natural Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG), Section IV, standards, including: Ponds (378), Waste Storage Facilities (313), or Wildlife Watering Facilities (648), as appropriate.

1. Flexible membrane linings shall be constructed of high quality materials and shall be certified by the manufacturer to be suitable for the intended use. Suitability shall address chemical resistance, liner flexibility for installation, life expectancy, and ultra-violet resistance.
2. All flexible membranes shall meet the material and installation requirements

of the plans and specifications provided for each installation. Minimum specifications are as follows:

Wisconsin Construction Specification 202. HDPE for High Density Polyethylene (HDPE), Very Flexible Polyethylene (VFPE) and Linear Low Density Polyethylene (LLDPE) liners.

Wisconsin Construction Specifications 203.

Geosynthetic clay liner (GCL) for Geosynthetic Clay Liners.

Wisconsin Construction Specification 205. Flexible Membranes for Poly Vinyl Chloride (PVC), Ethylene, Propylene, Diene Monomer (EPDM) or Polypropylene liners.

3. Membrane liners shall be protected from puncture by use of suitable soil materials in subgrade preparation as well as for cover material if required by the manufacturer. Maximum allowable particle size of soil cover material shall be 3/8-in., and rounded in shape, unless the liner is cushioned by a non-woven geotextile. Cover material must be sufficiently stable to resist sliding on the side slopes because of the weak shear plane created by the membrane. Side slopes shall not be steeper than 3H: 1V when a cover material is used. Membranes shall be covered or otherwise protected in areas that will be traversed by livestock, deer, or equipment.
4. All inlets, outlets, ramps, and other appurtenances to the structure being lined shall be installed in a manner that does not damage or impair the proper function of the liner.
5. Safety design shall identify and minimize the hazards to animals and people.

**VI. Considerations** - Additional recommendations relating to design, which may enhance the use of, or avoid problems with this practice, but are not required to ensure its basic conservation function are as follows:

1. The more *aquatic friendly* EPDM liner should be used for fish and wildlife ponds.
2. Gas venting channels beneath a geomembrane liner may reduce gas bubble formation when a geomembrane is installed over soils with high organic content or fluctuating water levels.
3. If high water tables could adversely affect the proper functioning of the facility, interceptor or relief type drainage systems should be utilized to control uplift pressures.
4. Side slopes of 3H: 1V or flatter may ease liner installation.
5. If a cover material is required, textured geomembranes may reduce sliding.

## VII. Plans and Specifications

Plans and specifications for sealing and lining ponds and other facilities with flexible membrane liners shall meet all of the requirements of the applicable standards and shall adequately describe the requirements and installation to achieve its intended purpose.

Plans for liner installation shall provide adequate details for all inlets, outlets, ramps, anchor trenches, and other appurtenances needed for a successful containment system.

## VII Operation and Maintenance

An operation and maintenance plan shall be developed that is consistent with the purposes of this practice.

## IX. Reference

USDA, Natural Resources Conservation Service, Field Office Technical Guide, Section IV, Appropriate Conservation Practice Standards and Construction Specifications.

## X. Definitions

*Suitable soil materials (V.B.3)* - soils that are in accordance with the construction specification for the chosen liner or according to the manufacturer's requirements.

*Aquatic friendly (VI.1.)* - Non-toxic, safe for fish, aquatic plants and animals.